

New The DAWN Report

DRUG ABUSE WARNING NETWORK

Issue 29, 2006R

Emergency Department Visits Involving ADHD Stimulant Medications

In Brief

According to the Drug Abuse Warning Network (DAWN) for 2004:

- An estimated 10,146 drug-related emergency department (ED) visits involved methylphenidate or amphetamine-dextroamphetamine, two medications used to treat attention-deficit/hyperactivity disorder (ADHD).
- The most frequent reason for these ED visits was nonmedical use (47%), followed by adverse reactions (35%), accidental ingestions (11%), and suicide attempts (7%).
- The rate of ED visits for adverse reactions to these two ADHD drugs for patients aged 12 to 17 years was double that for patients aged 18 to 24 years (3.3 and 1.6 visits per 100,000 population, respectively), while rates for nonmedical use were similar (5.3 and 5.5, respectively).
- Two thirds (66%) of the ED visits for nonmedical use of these two drugs involved other substances—such as alcohol, illicit drugs, or pharmaceuticals.

Studies in recent years have noted a rise in the number of children and adults who meet the criteria for a diagnosis of attention-deficit/hyperactivity disorder (ADHD), and more prescriptions are being written for the stimulants used to treat ADHD.^{1,2,3} In 2006, a Food and Drug Administration (FDA) advisory panel recognized the danger of side effects for ADHD stimulants and recommended that these medications carry a warning of an increased potential for cardiac problems, such as hypertension, cardiac arrest, and stroke.⁴ Increased prescribing of ADHD drugs will likely lead to more people experiencing these potential side effects and to increased use of these drugs for nonmedical purposes.⁵ The potential for greater access to these medications by persons without a prescription is supported by research, which has shown that peers are a common source of ADHD medications.⁶ The potential for medical problems may be exacerbated by the improper use of ADHD drugs or their use in combination with alcohol and other drugs.

The 2002 National Survey on Drug Use and Health (NSDUH) reported that an estimated 7.3 million persons aged 12 years or older in 2002 used ADHD stimulants nonmedically at some time in their lives. Among persons aged 12 to 17 years, 2.6 percent used ADHD stimulants nonmedically at some time in their lives; among those aged 18 to 25 years, the figure is 5.9 percent.⁷

The Drug Abuse Warning Network (DAWN), which collects data from a national sample of short-term, general, non-Federal hospitals,⁸ provides estimates of drug-related emergency department (ED) visits. The findings presented in this issue of *The DAWN Report* are based on ED visits related to two of the pharmaceuticals commonly used to treat ADHD—methylphenidate and amphetamine-dextroamphetamine. DAWN includes both generic and branded drugs, including methylphenidate (marketed as Ritalin™ and Concerta™) and amphetamine-dextroamphetamine (marketed as Adderall™). Based on 2004 DAWN data, this report examines the reasons for the ED visits involving ADHD drugs, the relative frequency of these ED visits for different age groups, and the use of alcohol and other drugs in combination with ADHD medications.

Overview

About 106 million ED visits occurred in short-term, general, non-Federal hospitals in the United States in 2004.⁹ DAWN estimates that about 2.5 million of these ED visits were drug related. The ADHD drugs examined in this report were implicated in less than 1 percent of those drug-related visits. Methylphenidate was involved in an estimated 5,148 ED visits, and amphetamine-dextroamphetamine was involved in an estimated 5,119 ED visits. A total of 10,146 ED visits involved one of these two drugs. (A few visits involved both drugs, so the total is slightly less than the sum of the drug-specific estimates.)

Reasons for ED visits

Among the 10,146 ED visits involving these ADHD medications, nonmedical use accounted for 47 percent of the visits, and medical use accounted for 35 percent (Table 1). Non-medical use includes cases where a higher than prescribed dose was used, a drug prescribed for another person was used, or there was other evidence in the medical record of drug misuse or abuse. An adverse reaction is a drug-related

ED visit that represents the negative health consequences of using a medication as prescribed (medical use). The balance of visits were accounted for by accidental ingestions (11%) and suicide attempts (7%).¹⁰

Patient age

The rates for nonmedical and medical use of the ADHD drugs generally decreased with age and were highest in persons aged 12 to 24 years. For persons aged 12 to 17 years, the rate of nonmedical and medical use for methylphenidate was the same, at 2.2 per 100,000 persons. The rate of nonmedical use for the two ADHD drugs combined was more than three times higher than for medical use for persons aged 18 to 24 years (5.5 vs. 1.6 per 100,000 population, respectively) (Figure 1).

Findings from another Office of Applied Studies (OAS) survey, NSDUH, suggest that nonmedical use of ADHD drugs is more frequent among those aged 18 to 25 years than among younger (e.g., aged 12 to 17 years) or older (aged 26 years or older) age groups. In contrast to NSDUH, DAWN found that the number of ED visits resulting from nonmedical use was essentially the same for those aged 12 to 17 years and those aged 18 to 25 years (5.3 and 5.5 per 100,000 population, respectively). A difference was found for medical use, though, where the rate of ED visits resulting from medical use for patients aged 18 to 24 years was just half that found for patients aged 12 to 17 years (1.6 vs. 3.3 visits per 100,000 population, respectively). DAWN had a similar finding as NSDUH in that the rate of ED visits resulting from nonmedical use among older persons (aged 26 years or older) is lower than that found for those aged 12 to 24 years.

Combining nonmedical and medical use, the rate of ED visits resulting from methylphenidate was similar for patients aged 12 to 17 years and those aged 18 to 24 years (both are 4.4 per 100,000 population), while ED visits resulting from the use of amphetamine-dextroamphetamine were higher for those aged 12 to 17 years, compared with those aged 18 to 24 years (4.3 vs. 2.7 per 100,000 population, respectively).

Table 1. Estimated ED visits, by reason for ED visit and drug

Reason for visit	Methylphenidate		Amphetamine-dextroamphetamine		Total ^a	
	ED visits	% of visits	ED visits	% of visits	ED visits	% of visits
Total ^b	5,148	100%	5,119	100%	10,146	100%
Nonmedical use	2,446	48%	2,303	45%	4,747	47%
Medical use	1,768	34%	1,760	34%	3,523	35%
Accidental ingestion	601	12%	668	13%	1,154	11%
Suicide attempt	333	6%	388	8%	721	7%

^a A few visits involved both drugs, so the totals are slightly less than the sum of the drug-specific estimates.

^b The total includes only the four types of ED visits shown. This excludes patients who presented to the ED specifically to seek admission to the hospital's detoxification or substance abuse treatment unit.

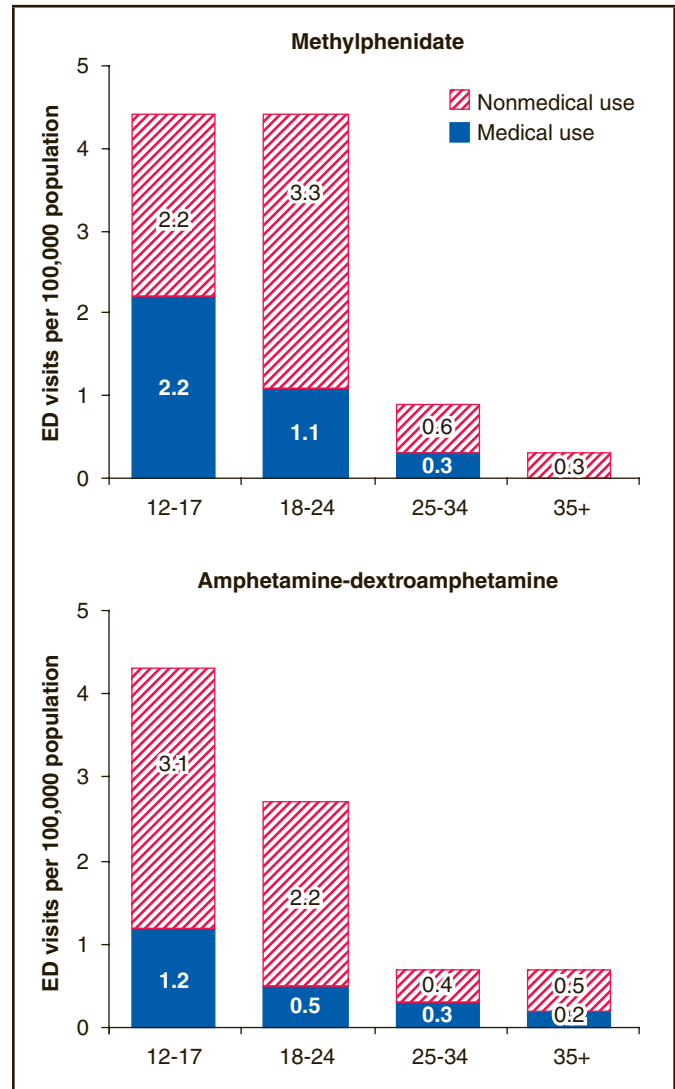
Drug combinations

Alcohol, illicit drugs, or other pharmaceuticals are often involved in ED visits associated with nonmedical use of ADHD drugs. Multiple drugs were present in two thirds (66%) of the nonmedical-use visits involving methylphenidate or amphetamine-dextroamphetamine (Table 2). Alcohol was present in over one quarter (26%), illicit drugs in about one quarter (23%), and other pharmaceuticals in almost one half (47%) of ED visits. The combination of ADHD medications with alcohol, illicit drugs, and other pharmaceuticals may heighten health risks.

Notes

1. Robison, L. M., Sclar, D. A., Skaer, T. L., & Galin, R. S. (1999). National trends in the prevalence of attention-deficit/hyperactivity disorder and the prescribing of methylphenidate among school-age children: 1990–1995. *Clinical Pediatrics*, 38(4), 209–218.
2. Wender, P. H. (1998). Pharmacotherapy of attention-deficit/hyperactivity disorder in adults. *Journal of Clinical Psychiatry*, 59(Suppl. 7), 76–79.
3. Kessler, R. C., Adler, L., Barkley, R., Biederman, J., Conners, C. K., Demler, O., et al. (2006). The prevalence and correlates of adult ADHD in the United States: Results from the National Comorbidity Survey Replication. *American Journal of Psychiatry*, 163, 716–723.
4. U.S. Department of Health and Human Services, Food and Drug Administration. (2006, January 6). Drug Safety and Risk Management Advisory Committee; Notice of meeting. *Federal Register*, 71(4), 942.
5. Cohen, A. L., Jung, M. A., & Budnitz, D. S. (2006, May 25). Stimulant medications and attention deficit–hyperactivity disorder. *New England Journal of Medicine*, 354(21), 2294–2295.
6. McCabe, S. E., & Boyd, C. J. (2005). Sources of prescription drugs for illicit use. *Addictive Behaviors*, 30(7), 1342–1350.
7. Kroutil, L. A., Van Brunt, D. L., Stahl, M. H., Heller, D. C., Bray, R. M., & Penne, M. A. (2006). Nonmedical use of prescription stimulants in the United States. *Drug and Alcohol Dependence*, 84, 135–143.
8. Specialty hospitals, including children’s hospitals, are excluded from the DAWN sample.
9. American Hospital Association (AHA) Annual Survey Database, Fiscal Year 2003. Health Forum LLC, Copyright 2004, One North Franklin Street, Chicago, IL 60606.
10. DAWN does not collect data on preexisting conditions, so it is not possible to know whether a specific drug or a preexisting condition, such as depression, contributed to the suicide attempt.

Figure 1. Rates of ED visits, by drug, type of use, and age



Source: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2004 (03/2008 update).

Table 2. Nonmedical use of ADHD medications in combination with other substances

	Methylphenidate	Amphetamine-dextroamphetamine	Total ^a	%
Total	2,446	2,303	4,747	100%
Single drug	845	770	1,615	34%
Multiple drugs ^b	1,601	1,533	3,133	66%
with alcohol	723	495	1,217	26%
with any illicit drug	427	685	1,110	23%
with other pharmaceuticals	1,187	1,027	2,213	47%

^a A few visits involved both drugs, so the totals are slightly less than the sum of the drug-specific estimates.

^b Components do not sum to total because categories are not mutually exclusive. For example, one multiple-drug visit may include alcohol and another pharmaceutical. Source: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2004 (03/2008 update).

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The **Drug Abuse Warning Network (DAWN)** is a public health surveillance system that monitors drug-related morbidity and mortality. DAWN uses a probability sample of hospitals to produce estimates of drug-related emergency department (ED) visits for the United States and selected metropolitan areas annually. DAWN also produces annual profiles of drug-related deaths reviewed by medical examiners or coroners in selected metropolitan areas and States.

Any ED visit or death related to recent drug use is included in DAWN. All types of drugs—licit and illicit—are covered. Alcohol is included for adults when it occurs with another drug. Alcohol is always reported for minors even if no other drug is present. DAWN's method of classifying drugs was derived from the Multum Lexicon, Copyright © 2008, Multum Information Services, Inc. The Multum Licensing Agreement can be found in DAWN annual publications and at <http://www.multum.com/license.htm>.

DAWN is one of three major surveys conducted by the Substance Abuse and Mental Health Services Administration's Office of Applied Studies (SAMHSA/OAS). For information on other OAS surveys, go to <http://www.oas.samhsa.gov/>. SAMHSA has contracts with Westat (Rockville, MD) and RTI International (Research Triangle Park, NC) to operate the DAWN system and produce publications.

For publications and additional information about DAWN, go to <http://DAWNInfo.samhsa.gov/>.